National Institute of Environmental Health Sciences

The quadruple squeeze: Defining the safe operating space for freshwater use to achieve a triply green revolution in the Anthropocene

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Abstract:

Humanity has entered a new phase of sustainability challenges, the Anthropocene, in which human development has reached a scale where it affects vital planetary processes. Under the pressure from a quadruple squeeze-from population and development pressures, the anthropogenic climate crisis, the anthropogenic ecosystem crisis, and the risk of deleterious tipping points in the Earth system-the degrees of freedom for sustainable human exploitation of planet Earth are severely restrained. It is in this reality that a new green revolution in world food production needs to occur, to attain food security and human development over the coming decades. Global freshwater resources are, and will increasingly be, a fundamental limiting factor in feeding the world. Current water vulnerabilities in the regions in most need of large agricultural productivity improvements are projected to increase under the pressure from global environmental change. The sustainability challenge for world agriculture has to be set within the new global sustainability context. We present new proposed sustainability criteria for world agriculture, where world food production systems are transformed in order to allow humanity to stay within the safe operating space of planetary boundaries. In order to secure global resilience and thereby raise the chances of planet Earth to remain in the current desired state, conducive for human development on the long-term, these planetary boundaries need to be respected. This calls for a triply green revolution, which not only more than doubles food production in many regions of the world, but which also is environmentally sustainable, and invests in the untapped opportunities to use green water in rainfed agriculture as a key source of future productivity enhancement. To achieve such a global transformation of agriculture, there is a need for more innovative options for water interventions at the landscape scale, accounting for both green and blue water, as well as a new focus on cross-scale interactions, feed-backs and risks for unwanted regime shifts in the agro-ecological landscape.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2890077

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Security, Food/Water Security

Food/Water Security: Agricultural Productivity

Geographic Feature:

resource focuses on specific type of geography

Freshwater

Geographic Location: ☑

resource focuses on specific location

Global or Unspecified

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Intervention: ☑

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type: ☑

format or standard characteristic of resource

Review

Resilience: ☑

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale: ☑

time period studied

Time Scale Unspecified